Computer Assisted Technology Transfer

A National Reinvention Laboratory

EXECUTIVE SUMMARY

Parts on Demand Project

(CATT Phase II)

Volume 1 of 2

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The DoD continually assesses threats to the nation's security and moves rapidly to develop appropriate counter-measures. In addition to modern battlefield hazards, the logistics of maintaining mission readiness presents many challenges. The GAO has recently analyzed some of the issues the joint services are facing as the plans for sustaining aircraft operations through the next century are being formulated. The GAO has profiled DoD challenges in: maintaining an aging aircraft fleet, reducing response time and cost of providing the spare parts, implementing commercial inventory management practices, reinventing buying and contracting practices, locating the original manufacturing source for components, monitoring available capacity of alternate sources at the firm or plant level, achieving more efficient interaction with the industrial base, digitizing massive amounts of technical data, grouping parts in logical families, reducing the large percentage of no-bids for small lot sizes, coping with diminishing manufacturing sources and material shortages. As part of the response to these and other challenges, the Computer Assisted Technology Transfer (CATT) program was initiated. The Defense Logistics Agency (DLA) assimilated the CATT Program into the National Reinvention Laboratory program in 1995. The CATT program is focused on analyzing alternative business models for government supply operations to ensure mission readiness. Through a series of controlled interventions, the CATT program focuses resources on specific problems and analyzes the effectiveness of a proposed alternative business model in a controlled, simulated environment. This report presents an executive summary of CATT Program Phase II activities and the major findings from these activities.

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ABSTRACT

The United States Department of Defense (DoD) continually assesses threats to the nation's security and moves rapidly to develop appropriate counter-measures. In addition to modern battlefield hazards, the logistics of maintaining mission readiness presents many challenges. The United States General Accounting Office (GAO) has recently analyzed some of the issues the joint services are facing as the plans for sustaining aircraft operations through the next century are being formulated. Through a series of reports (GAO Report Refs: 1 through 20), GAO has profiled DoD challenges in:

- maintaining an aging aircraft fleet
- reducing response time and cost of providing spare parts
- implementing commercial inventory management practices
- reinventing buying and contracting practices
- locating the original manufacturing source for components
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As part of the response to these and other challenges, the Computer Assisted Technology Transfer (CATT) Program was initiated. The Defense Logistics Agency (DLA) assimilated the CATT Program into the National Reinvention Laboratory program in 1995. The CATT Program is focused on analyzing alternative business models for government supply operations to ensure mission readiness. Through a series of controlled interventions, the CATT Program focuses resources on specific problems and analyzes the effectiveness of a proposed alternative business model in a controlled, simulated environment.

Volume 1 of this report presents an executive summary of CATT Program Phase II activities and the major findings from these activities. The technical reports which document the specific Phase II projects, including detailed activity descriptions, are presented in Volume 2.

1.0 FORCES UNDERLYING THE CATT PROGRAM

1.1 AGING WEAPON SYSTEMS AND CHANGING MISSIONS DICTATE NEW SUPPORT STRATEGIES

In its report, "U.S. Combat Air Power: Aging Refueling Aircraft are Costly to Maintain and Operate," the GAO documented:

> Due to the changing nature of defense operations, the demands on the Services' air refueling fleet have not diminished since Operation Desert Storm. However, the Air Force's principal tanker aircraft—the KC-135s—are 30 to 40 years old and, as a result, are taking progressively more time and money to maintain and operate.

How much more time and money is dramatically shown in Figure 1.1-1. Besides the statistics shown, the labor hours planned to complete depot overhauls of the KC-135s increased by about 36 percent between fiscal years 1991 and 1995. The cost per KC-135 flying hour is projected to increase from $8,662 in 1996 to $10,761 in 2001. These increases must be managed in parallel with increased mission requirements that rely on the KC-135 availability.

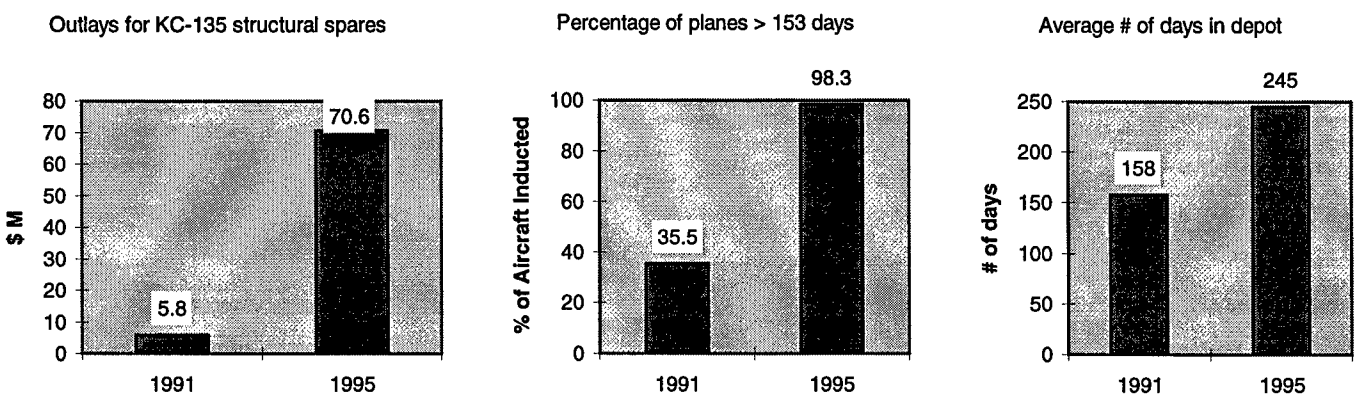


Figure 1.1-1 Increases in Structural Spares, Deadlined Aircraft, and Depot Turnaround Time

Since aircraft availability is critical, it is important to focus on the issues responsible for the increase in depot maintenance time. According to the USAF, the growth in planned work

included time to apply corrosion preventive compounds and rewire significant portions of each aircraft. In addition, shortages of spare parts that were no longer stocked or in production, and unplanned work required to correct structural corrosion and fatigue, contributed to maintenance delays and reduced aircraft availability.

The USAF cited the age of the aircraft and a lack of replacement parts as primary reasons for the increased maintenance time. The KC-135 System Program Office at the Oklahoma City Air Logistics Center developed an Aircraft Sustainment Master Plan to identify actions required to sustain the C/KC-135 fleet. This plan included efforts to assess the impact of corrosion on the operational and economic life of the aircraft. The master plan cited replacement part shortages as a major cause of extended depot stays for KC-135s. More than 500 items were identified as critical to timely support.

About 60 percent of these items had not been authorized for stockage, while the other parts had not been adequately stocked, according to the Air Force. Stock levels of these items were increased to meet higher parts failure rates occurring due to the age of the aircraft. Critical items included fuselage skins and major structural components. Outlays for these parts rose from $5.8 million in fiscal year 1992 to $70.6 million in fiscal year 1995.

The KC-135 is just one aging weapon system confronting these problems and requiring such outlays. The role of the CATT Program is to reduce these outlays by developing innovative supply acquisition strategies involving broader, more responsive segments of the industrial base. Dramatically reduced logistics response times will result in higher aircraft availability and enhance mission effectiveness.

1.2 GOVERNMENT BUYING STRATEGIES MUST TARGET RESPONSIVE NETWORKS OF COMMERCIAL SUPPLIERS

Major reductions in national defense spending have caused the defense manufacturing industry to diversify in favor of commercial contracts. While striving to maintain spare parts inventories and meet maintenance production requirements, the DoD must increasingly share available manufacturing capacity with commercial enterprises. The complicated, paperwork-intensive DoD solicitation process discourages many manufacturers who are accustomed to working with leaner commercial partnerships. Recognizing this trend, DLA and the Services are reinventing these processes and adopting electronic commerce infrastructures to enable efficient interaction with industrial sources.

An immediate benefit of these improvements is a reduction in total logistics response time. Logistics response time is defined as the time that elapses between the date a requisition is established by a customer and the date that the customer actually receives the material. The segments of the total logistics pipeline are shown in Figure 1.2-1.

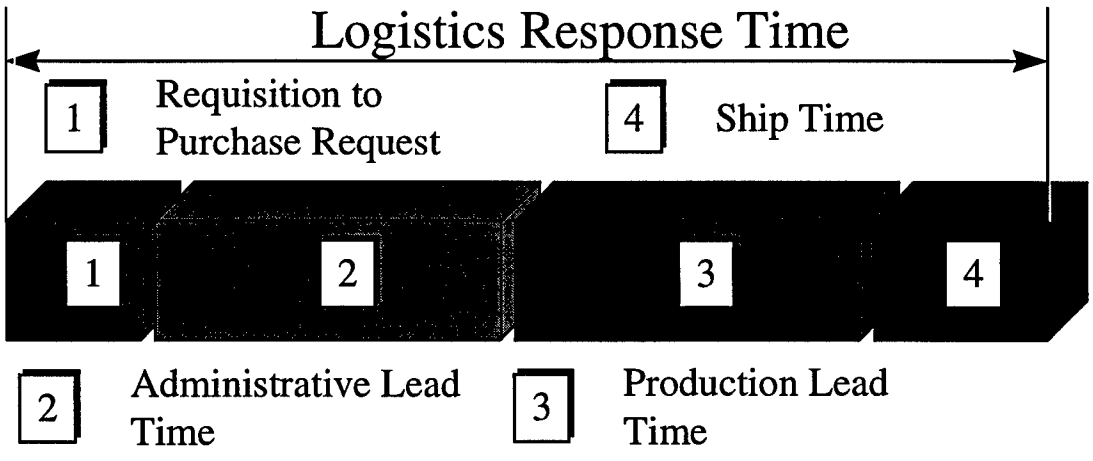


Figure 1.2-1 Segments of Logistics Pipeline Involved with Response Time Analysis

DLA performed an analysis of the logistics response time for aircraft structural parts, Federal Supply Class (FSC) 1560. Of the 109,498 items in this class, the average administrative and production lead times were 141 and 273 days respectively. This class was targeted by

Defense Supply Center Richmond (DSCR) as an initial candidate for DLA's On-Demand Manufacturing Program. KC-135 parts within this class are being targeted by the CATT Program. As shown in Figure 1.2-2, the low, sporadic demand patterns and low number of qualified manufacturing sources make FSC 1560 parts a challenge to acquire.

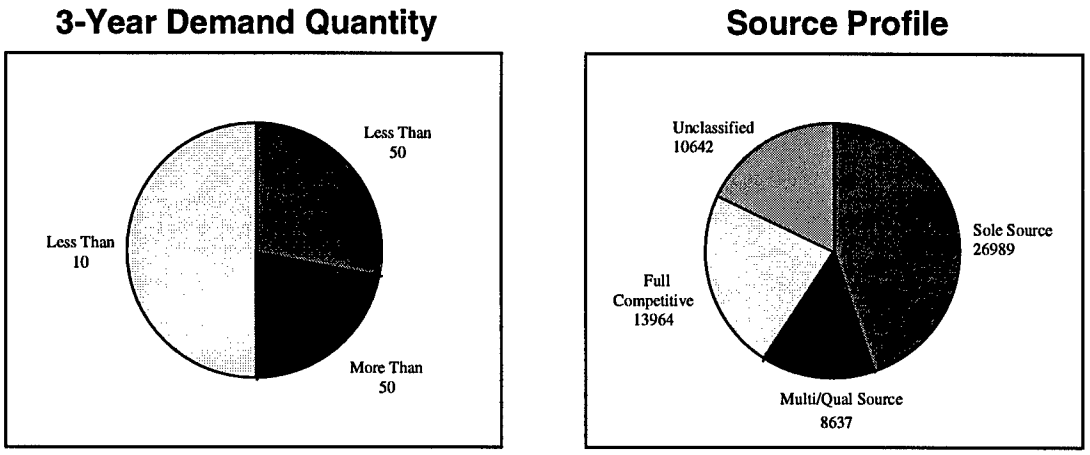


Figure 1.2-2 Characterization of FSC 1560 Demand Patterns and Sources

DLA's logistics response time reduction initiatives were based on the recommendations of a study performed for DoD by the Logistics Management Institute. This study showed that a 25-percent reduction in lead-time was achievable by adopting methods proven successful in the private sector. In stressing the significance of the initiatives, DoD commented that for each day the DoD-wide average lead-time is reduced, future purchases can be reduced by $10 million.[1]

A major objective of the CATT Program is to identify and implement logistics response time reduction strategies while broadening the pool of available sources. One of the techniques service commands use to accomplish this is spare parts breakout. Breakout is the purchase of spare parts from actual manufacturers rather than from prime contractors as a way to increase competition. This is uniformly recognized as an effective means of achieving price reductions. Spare parts breakout has the added benefit of reducing acquisition lead-time by eliminating the processing time that a prime contractor adds for passing an order to the actual manufacturer.

At the Army Aviation and Troop Command, for example, the purchase of spare parts for the Blackhawk helicopter has been almost completely broken out. The program manager told the GAO that, in his experience, production lead-time always goes down, often times by half, when a spare part is broken out for direct purchase from the actual manufacturer. The prime contractor for the B-2 bomber stated that by ordering from it rather than directly from actual part manufacturers, the Air Force inadvertently added five months to the lead-time for receipt of spare parts deliveries. The CATT Program is developing databases in order to assist DLA and the Services in executing its future spare parts breakout programs.

[1] Procurement Lead-time: The Forgotten Factor (Logistics Management Institute, Sept. 1986).

2.0 A MEASURED RESPONSE TO CHANGE: COMPUTER ASSISTED TECHNOLOGY TRANSFER (CATT) PROGRAM

The Computer Assisted Technology Transfer (CATT) Program was initiated to investigate alternative business practices which have potential to positively affect mission readiness in light of the rapidly changing environment described in the previous section. More specifically, the CATT Program is focused on defining a business model which would expand the DoD industrial base and therefore reduce logistics lead-times. In support of these objectives, the Parts on Demand Project, Phase II of the CATT Program, was designed to prototype and test various business models under a simulated DoD procurement environment such that the efficiency of specific remedies to major contributors of long lead times could be measured.

2.1 FOCUS ON KC-135 PARTS PROBLEMS

The Technology and Industrial Support Directorate at the Oklahoma City Air Logistics Center (OC-ALC) in partnership with the Defense Supply Command Richmond (DSCR) identified the KC-135 tanker fleet as the primary focus for the Parts on Demand Project and elected to emphasize structural parts for this phase of the CATT Program. By doing so, the Parts on Demand Project was able to conduct academic research projects designed to support the CATT Program objectives while simultaneously applying resources to resolve some of the challenges facing the KC-135 tanker fleet as summarized in Figure 2.1-1. These challenges included extended depot maintenance days due to parts shortages and therefore a reduction in mission availability.

- Current Plan to Extend Service Life through 2040
- Diminishing Sources of Supply for Parts
- Time Required for Depot Maintenance Increasing
- Increased Demand for Non-Stocklisted Parts

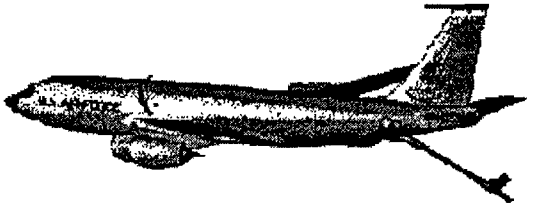


Figure 2.1-1 KC-135 Parts Challenges

The KC-135 Weapon System Manager had already established the infrastructure necessary to shift management focus to meet these challenges. A multi-disciplined team was formed to determine the root cause(s) of parts shortages and begin to develop strategies to resolve the critical items. The Parts on Demand Project was able to capitalize on this foundation to identify candidate parts to support a series of manufacturing demonstrations focused on developing new sources. A major advantage of this approach was the ability to focus resources on increasing the willingness and competitiveness of the manufacturers in the Oklahoma region to meet the real parts production requirements for the KC-135 structural items. The ultimate goal was to develop and test the elements of the business model in Oklahoma and develop a strategy for implementing it elsewhere.

2.2 FOCUS ON THE OKLAHOMA SMALL MANUFACTURING INDUSTRY

The State of Oklahoma provides an excellent testbed for the business model. Oklahoma manufacturing industry is primarily geared toward meeting the needs of the aerospace, automotive, and oil and gas markets. With over 50,000 employed, the manufacturing sector represents over 11% of the total Oklahoma nonagricultural labor force. Some of the major aerospace firms represented are American Airlines Maintenance Center, Gulfstream Aerospace, McDonnell Douglas, and Rockwell International as well their many third tier suppliers.

The State of Oklahoma has focused a major share of its resources to ensure the availability of a well-trained workforce with up-to-date knowledge in the latest technologies. Training for new and expanding industry is provided through the Oklahoma Department of Vo-Tech's Training for Industry Program. This unique program is administered by the Business and Industry Training Services and is delivered through a statewide network of 54 sites. Since its creation in 1968, Oklahoma's Training for Industry Program has earned an international reputation by providing more than 600 industries with a trained, start-up work force.

Most Oklahoma small to medium sized manufacturing enterprises are capable of producing items in compliance with the detailed requirements of DoD technical data packages. However, DoD inventory reduction strategies have resulted in reduced buy quantities, causing many manufacturers to abandon DoD production contracts in favor of more profitable commercial contracts. Also, the complexity of the solicitation and contract award process is contributing to the reluctance of these smaller firms to seek out DoD contracts. The combination of a very capable yet reluctant manufacturing base enabled the Parts on Demand Project to determine specific barriers to the expansion of the DoD supplier base and analyze mitigation strategies.

2.3 PROJECT STRUCTURE

The Parts on Demand Project is structured to facilitate the flow of information among the principle participants as shown in Figure 2.3-1. There were two principle components: (1) a series of part manufacturing demonstrations exercising various forms of the business model and (2) a set of academic research projects, performed by Oklahoma State University, designed to feed data to, draw data from, and analyze the results of the manufacturing demonstrations.

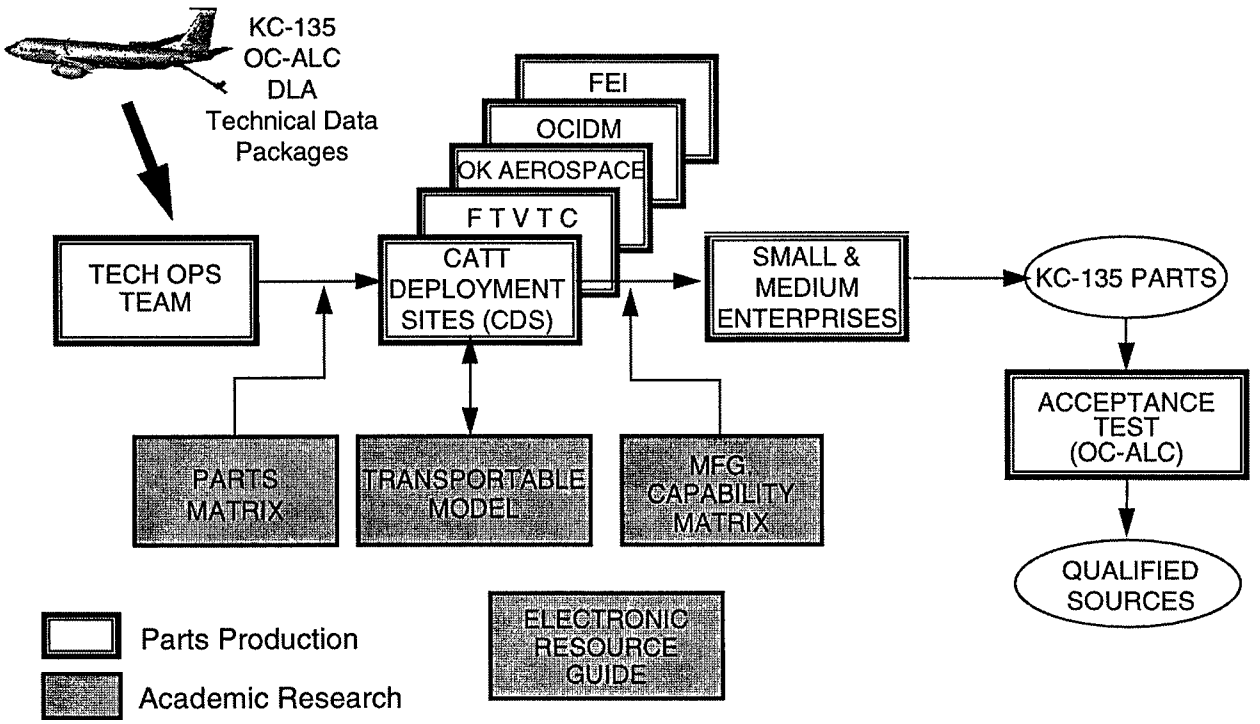


Figure 2.3-1 Parts on Demand Structure

2.4 CATT DEPLOYMENT SITES

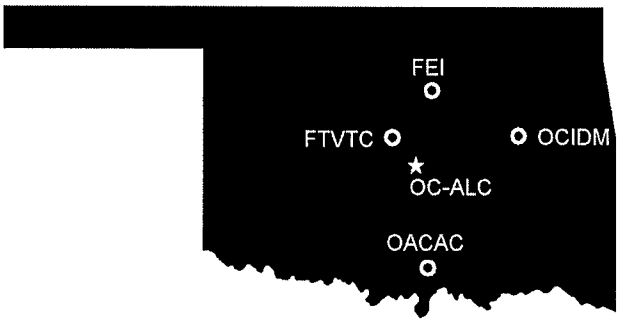
The concept of a CATT Deployment Site (CDS) was created to serve as the core element of the business model. The CDS was formed to bridge the gap that currently exists between DoD and a large portion of the industrial supplier base, particularly Small and Medium sized Enterprises (SMEs). The CDS role was to provide assistance to the manufacturer with the government solicitation process, interpretation of the technical data package conventions and standards, and to ensure the manufacturing processes were in accordance with all simulated solicitation requirements.

The project created four CDSs with distinct organizational structures in order to compare and contrast the relative effectiveness of each entity type, as well as to refine the definition of required capabilities for a CDS. The organizational entities selected to be CDSs were deliberately

diverse in order to provide a robust database for the evaluation. Multiple requirements were established to qualify an organization as a viable CDS candidate. Primary required capabilities included:

- Knowledge of DoD procurement practices and requirements.
- Ability to form virtual partnerships of SMEs to produce parts.
- Mentoring skills to enable SMEs not currently working for DoD to succeed.
- Familiarity with current and upcoming technologies (e.g., EC/EDI) impacting future DoD procurement.

Many organizations were identified as a potential CDS. The candidates were surveyed and follow-up interviews were conducted prior to making the final selection. Two of the selected CDSs were enlisted to leverage the resources which the State of Oklahoma has already focused on enabling the manufacturing industry in the region. The organizational diversity which is represented in the selected CDSs provided a good balance for the research projects. Figure 2.4-1 and the accompanying table identify the selected CDSs and summarize the rationale for selection.



Organization	Business Mission	Special Considerations
Francis Tuttle Vocational-Technical Center (FTVTC)	Education	Also a Bid Assist Center and VAN SAT provider
Oklahoma Aerospace Contract Assistance Center (OACAC)	Private Consulting	Represents Private Entrepreneur Model
Oklahoma Center for Integrated Design and Manufacturing (OCIDM)	University/Industry Consortium	Receives State Sponsorship as well as Federal Funding
Frontier Engineering, Inc. (FEI)	Engineering	Once mentored by TRW

Figure 2.4-1 CATT Deployment Sites

2.5 MANUFACTURING DEMONSTRATIONS

Figure 2.5-1 displays the steps in the Manufacturing Demonstration process. In order to simulate the DoD procurement environment and simultaneously develop viable suppliers, the Parts on Demand Project focused parts prototyping efforts on KC-135 items which were difficult to procure. Specifically, Federal Stock Class (FSC) 1560 Airframe Structural Components used on the KC-135 tanker aircraft with current buy requirements were given top priority. The Parts on Demand Project exercised the manufacturing demonstration process with 20 candidate parts recommended by DSCR.

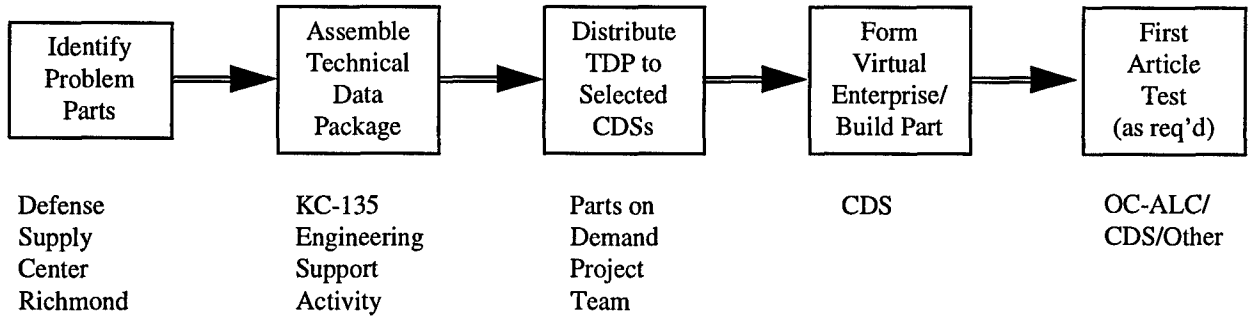


Figure 2.5-1 Manufacturing Demonstration Process

The Parts on Demand Project team, working closely with DSCR, facilitated the assembly of the Technical Data Packages (TDPs) for the identified demonstration parts. The KC-135 Engineering Support Activity (ESA) at OC-ALC was enlisted to help assemble, and most importantly verify the accuracy and completeness of the TDPs.

Upon receipt of an approved and verified TDP, the Parts on Demand Project team confirmed the legibility and completeness of the technical data and performed a preliminary assessment of the part to be produced. The Parts on Demand Project team selected two or more CDSs for each part to increase the available data for the research and ensure that at least one team would successfully produce the part.

The CDSs were responsible for producing each prototype part in accordance with all applicable specifications. They were directed to define a manufacturing strategy and formulate a virtual enterprise to execute this strategy. When forming the virtual enterprises, the CDSs were specifically directed to search out SMEs who had not previously contracted for DoD parts. The virtual enterprises were required to submit a mock bid and establish a simulated contractual relationship with the CDS, closely mirroring the actual DoD procurement process.

The virtual enterprise submitted completed parts to the CDS with various certifications that the part was manufactured as specified in the TDP. The CDS verified the adequacy of the delivered hardware and associated documentation. Parts that normally require a first article inspection were submitted to OC-ALC for inspection by the TICL branch. Parts not requiring

formal first article inspection were inspected and evaluated, each according to its unique characteristics, by the Parts on Demand Project team and the CDSs.

The manufacturing demonstration process was used repeatedly during the Parts on Demand Project to produce a series of DSCR managed parts while simultaneously developing new DoD parts supply sources. Equally important, the series of demonstrations provided a test bed for a group of complimentary academic research projects to develop and evaluate business assistance models and other ways of improving the logistics of response time.

2.6 ACADEMIC RESEARCH PROJECTS

There were four research projects undertaken during the Parts on Demand Project. Each of the research projects was formulated to address a portion of the logistics problem affecting the procurement of airframe structural parts. The academic research projects are described below.

2.6.1 CATT Transportable Model Studies

The CATT Transportable Model Studies Project conducted research on the relative effectiveness of the different CDS organizations to provide the requisite support to the virtual enterprises created under the Parts on Demand Project. Additionally, the project evaluated and analyzed the various barriers and problems SMEs face in contracting for DoD parts procurements. The goal of the Transportable Model Project was to define a viable business model which can be used nationally to expand the DoD industrial supplier base.

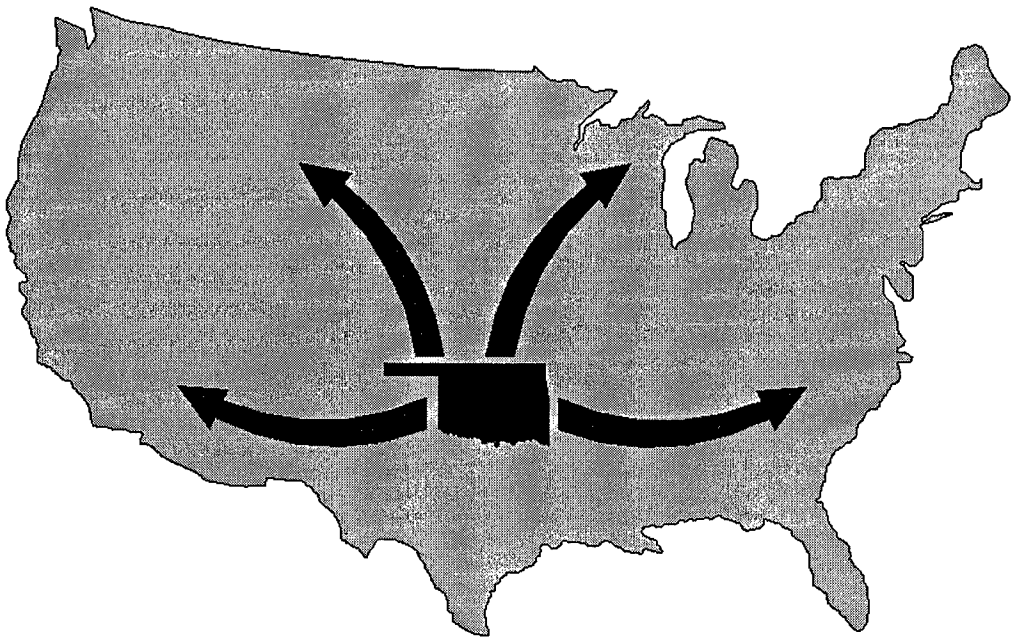


Figure 2.6-1 Transportable Model Academic Research Project

2.6.2 The Investigation of the Classification and Coding of KC-135 Parts to Assist in Associating Needed Parts and Manufacturers

The Investigation of the Classification and Coding of KC-135 Parts to Assist in Associating Needed Parts and Manufacturers Project, also known as the Parts Characterization Matrix Project, was undertaken to establish a feasible classification scheme for mechanical parts which would support the concept of grouping parts for procurement purposes. Solicitations for grouped parts are more attractive to potential bidders since larger buy quantities enable manufacturers to consolidate material purchases. The Parts Characterization Matrix provides the tool necessary to facilitate parts grouping.

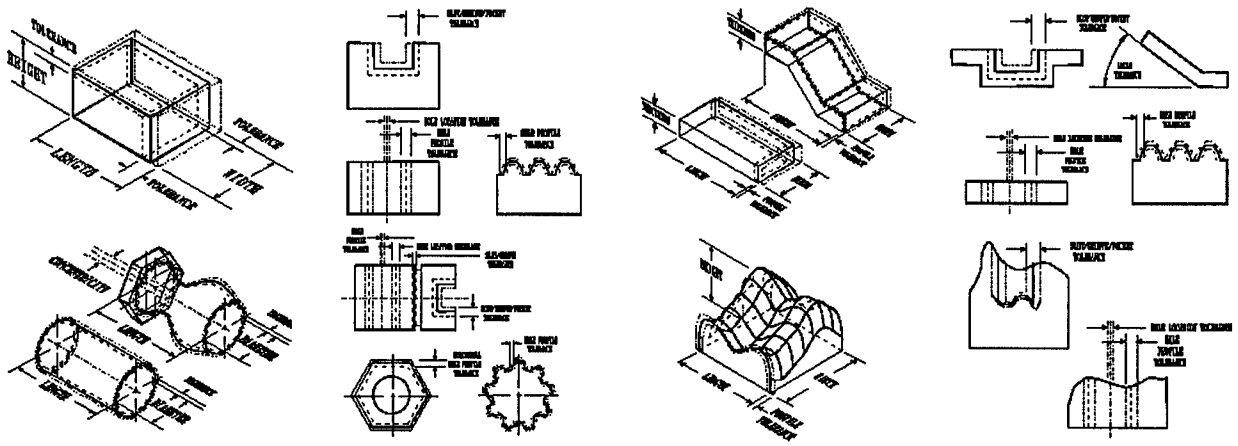


Figure 2.6-2 Parts Characterization Matrix

2.6.3 The Manufacturing Resource Matrix

The Manufacturing Resource Matrix established a coding scheme to describe the manufacturing capabilities (e.g., size, shape, tolerance, and material) of regional SMEs. The coding scheme for the Manufacturers Resource Matrix may be used with the Parts Characterization Matrix to match needed parts with SMEs capable of producing them.

2.6.4 CATT World Wide Web (WWW) Page

The CATT World Wide Web (WWW) Page Project established an on-line resource for the dissemination of CATT Program information over the internet. In addition to maintaining up-to-date information on the specifics of the CATT Program, the WWW Page Project provided hypertext links to various sources of information which would be useful to an SME in learning and understanding the DoD procurement process and new technologies being developed to facilitate and improve it. The highlights of the web page functions are shown in Figure 2.6-3.

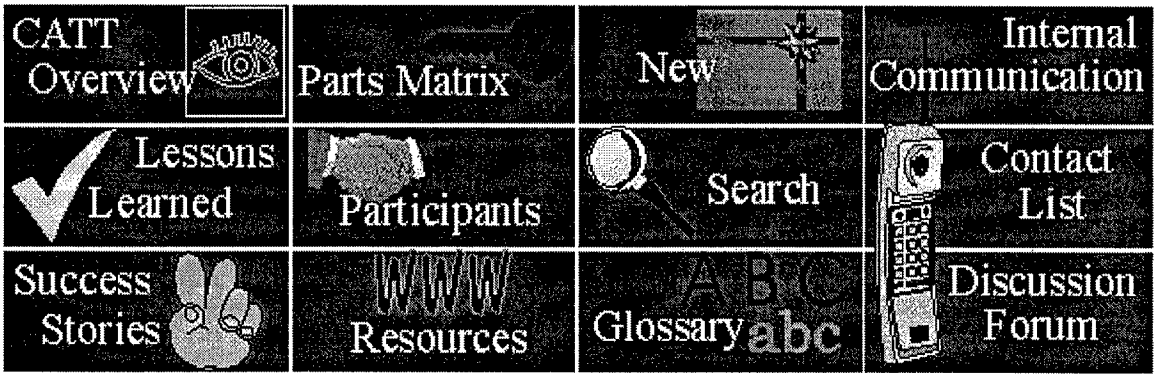


Figure 2.6-3 CATT WWW Page

3.0 FINDINGS

3.1 RESULTS

3.1.1 Prototype Manufacturing of Ten Different Parts Was Completed

DSCR originally identified twenty difficult to acquire parts for use as manufacturing demonstration articles on the CATT Phase II Parts on Demand Project. All were Federal Stock Class (FSC) 1560 Airframe Structural Component parts used on the KC-135 weapon system. In terms of manufacturing complexity, the parts ranged from relatively simple to complex. Figure 3.1-1 shows a few of these parts. The reasons for classification as problem parts also varied, typical reasons being:

- Contractors defaulting in prior contracts.
- No responses to most recent solicitation.
- Current manufacturer in bankruptcy.
- Material acquisition problems.

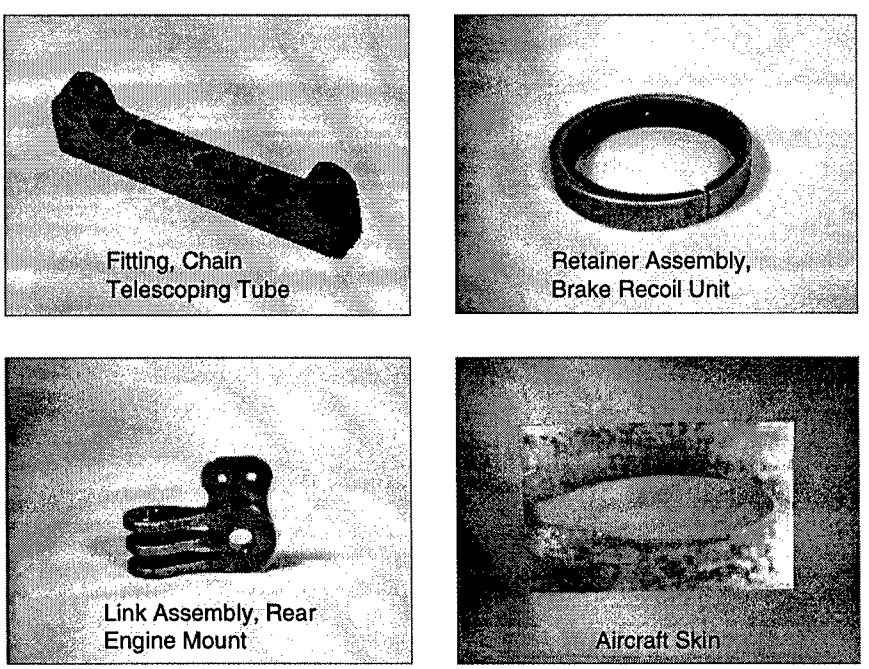


Figure 3.1-1 Representative CATT-Produced Parts

As indicated in Figure 3.1-2, ten of the twenty candidate parts were manufactured through the CDS process. The remaining parts were not manufactured due primarily to material acquisition problems and requirements for substantial capital equipment investment in tooling, and to a lesser degree to TDP deficiencies revealed in the manufacturing process. For several of the ten parts manufactured, multiple sources were developed.

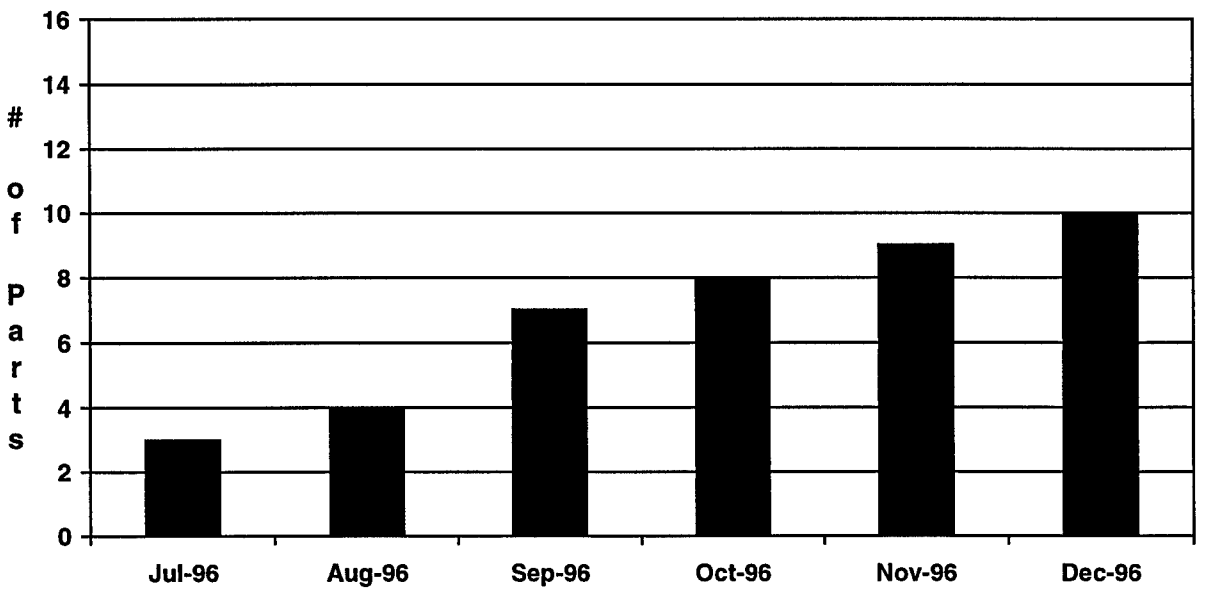


Figure 3.1-2 CATT Parts Manufactured

3.1.2 Thirty-Two Oklahoma-Based Companies Were Enabled as DoD Suppliers

The CDSs were challenged to find an SME, or virtual enterprise comprised of several SMEs, to manufacture each assigned part. They were directed to particularly focus on involving new sources in the process. In the end, 32 different firms were involved in manufacturing the 10 parts (refer to Figure 3.1-3) including several who had no prior DoD experience.

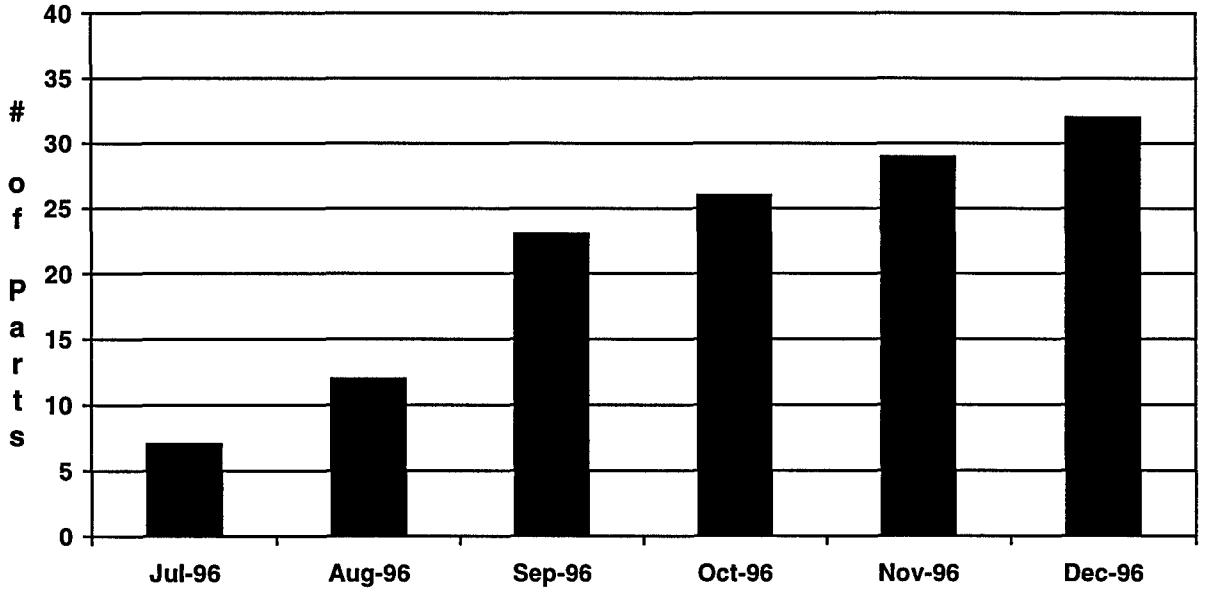
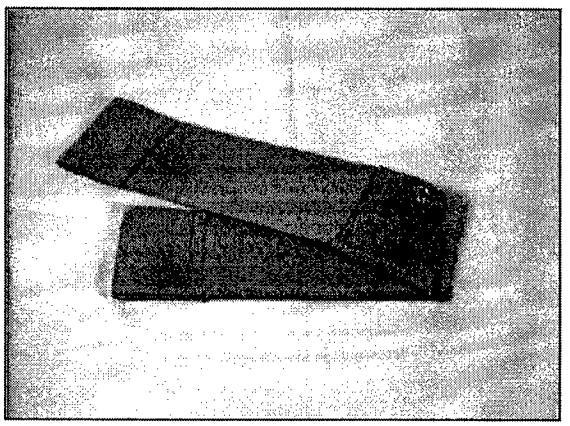


Figure 3.1-3 Companies Enabled as DoD Suppliers

The experience with one particular part, the KC-135 Shin Support Assembly (Figure 3.1-4), illustrates the range of manufacturing sources developed by the CDS. One CDS, the Francis Tuttle Vocational-Technical Center, worked with a commercial manufacturer of bedding, Oklahoma Mattress Company. A second CDS, Oklahoma Center for Integrated Design and Manufacturing, worked with a manufacturer of leather goods, W.R. Western Company. Both firms were able to produce the required part while learning about the DoD bid and contracting process through CDS mentoring.



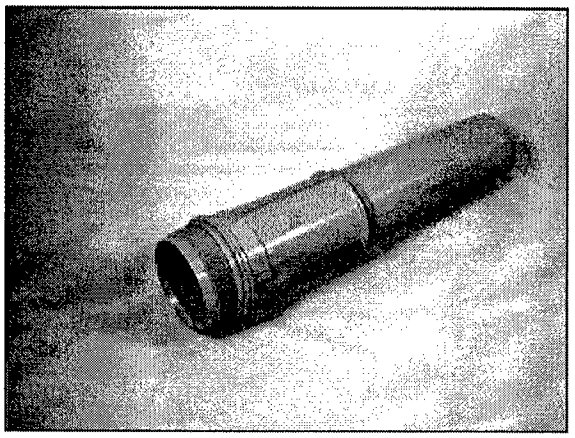
Manufactured by:

- Oklahoma Mattress Company
- W.R. Western Company

Figure 3.1-4 KC-135 Shin Support Assembly

3.1.3 The Virtual Enterprise Business Model Was Demonstrated

For simple parts, such as the Shin Support Assembly described previously, the CDSs were able to identify a single firm capable of manufacturing the part. However, for some of the more complex parts, no individual firm had the complete set of capabilities necessary to produce the part alone. In such cases, the CDS defined and executed a strategy which entailed formation of a virtual enterprise, that is, a set of manufacturing firms that collectively can manufacture the part. Illustratively, each of the four CDSs formed a virtual enterprise to manufacture a first article of the Shock Absorber Tube, a critical structural item on the KC-135 boom assembly. Figure 3.1-5 displays this part and the virtual enterprise assembled by one CDS to produce it.



Virtual Enterprise	
Raw Material:	Alcoa Aluminum
Machining:	Pro-Fab; Oklahoma City, OK
Anodizing:	Quality Plating; Tulsa, OK
Dye Penetrant:	IRIS; Oklahoma City, OK

Figure 3.1-5 Shock Tube Assembly

3.1.4 385 Parts Were Classified in the Characterization Matrix

The Part Characterization Matrix project included the classification and coding of 385 mechanical piece parts being used on the KC-135 weapon system. The parts classification schema, which allows similar parts to be grouped together for production purposes, was refined and tested. The matrix facilitates the grouping of parts using a 20-digit classification coding scheme based on attributes such as shape, material dimensions, and tolerance. Continued grouping of parts, enabling larger, more economical buys, will make it far easier to attract industrial suppliers.

3.1.5 119 Companies Were Included in the Manufacturing Resource Matrix

The interface between the Parts Characterization and Manufacturing Resource Matrix was developed, thus facilitating the identification of qualified vendors for grouped parts. More than 400 Oklahoma-based firms were identified to participate in the program; of these 119 provided the required manufacturing capabilities which were then loaded into the matrix.

3.1.6 EC/EDI Was Successfully Demonstrated to Accelerate the Acquisition/Manufacturing Process

The project made significant strides in educating Oklahoma small manufacturers in EC/EDI and satellite technologies. One of the CDSs, the Francis Tuttle Vocational-Technical Center (FTVTC), is a Value Added Network Satellite (VANSAT) service provider. FTVTC successfully formed virtual enterprises and orchestrated the manufacture of six different parts for the Parts on Demand Project. In each case, they converted the original paper or mylar Technical Data Package into a digitized vector file. This file was then disseminated to virtual enterprise members using EC/EDI methods via satellite. Besides demonstrating significant savings in lead-time, this approach served to educate and indoctrinate their firms in the use of a procurement process which is sure to be pervasive, both commercially and for the DoD.

3.1.7 The New Business Model Works in the State of Oklahoma

The results of the Parts on Demand Project prove the viability of the CATT Deployment Site and Virtual Enterprise concepts as solutions to the growing problem of diminishing manufacturing sources for DoD parts. Each CDS was successful in drawing manufacturers, several of whom had never done business with DoD, to participate in the project. An immediate benefit to the DoD is the establishment of qualified manufacturing sources for each of ten parts successfully manufactured during the project. The manufacturers, in turn, have benefited from the opportunity for significant future business and from advancing their knowledge of DoD procurement practices and standards. While it remains to be seen whether a CDS can financially sustain itself without subsidization, exportation of the business model to other regions can catalyze a broader growth of the DoD supplier base for manufactured parts.

3.2 OTHER LESSONS LEARNED

During the course of the manufacturing demonstrations, lessons learned from the process were compiled. The objectives were threefold:

- Uncover and remove barriers discouraging manufacturers from participating in the DoD market
- Identify factors contributing to long lead-times, no-bids or contract defaults
- Define technology infrastructure investments for future CATT efforts.

The most significant of these lessons learned are highlighted below. Others can be found in the CDS reports (Parts on Demand Final Report Refs. 5, 6, and 7).

3.2.1 Despite Barriers, Small Oklahoma Manufacturers are Interested in DoD Business

OCIDM reported in Parts on Demand Final Report Ref. 7 that their CDS experience led to a conclusion that there is a willingness, in fact a desire, of most small manufacturers with whom they worked to compete for DoD acquisitions. However, they require help, such as that provided by the CDS, to compete effectively and succeed.

3.2.2 Small Buys Lead to No-Bids

Small quantity procurements was a frequently mentioned reason for not doing DoD business (Parts on Demand Final Report Refs. 5 and 6). Among other things, small buys make long-term business planning and supplier relationships impractical. Clearly, further development of grouping technologies such as the Parts Characterization Matrix will be needed to enable larger buys and thus attract more small manufacturers.

3.2.3 Small Manufacturers Could Better Respond if Forecasts were Available

Currently, the small manufacturers participating in this project have no insight into forecasted part needs. It is not possible for them to plan their business, make necessary plant investments or purchase long lead-time materials without such forecasts.

3.2.4 Qualified Sources are Sometimes Unaware of Part Needs

For at least two parts, the CDS discovered that a qualified manufacturer of the part already existed in state. Some manufacturers are not accustomed to scanning the Commerce Business Daily to identify opportunities. In these cases, the CDS worked with the manufacturer to help him understand modern procurement practices, including EC/EDI

3.2.5 Technical Data Package Problems are Pervasive

The TDPs for many of the parts were poor copies of aperture cards. Problems were discovered in the areas of drawing readability, and material, process, and assembly specifications that are no longer active. It is indicative that the time to update and correct the TDP is a significant contributor to acquisition lead-time. While an across-the-board solution to this problem for all 1560 FSC parts may not be feasible, investments in TDP improvement technologies are clearly warranted.

3.2.6 Improved Engineering Communications Channels are Needed

All parts manufactured during the project are managed by DSCR. However, the Engineering Support Activity (ESA) is located at OC-ALC. The Parts on Demand Project served as a catalyst for greatly improved communications between the ESA and responsible DLA engineers. Effective communication is essential since much of the engineering expertise for these parts resides with the ESA, and probably will for several years. In the absence of effective communication, the chances are high that solicitations will be issued without the most recent TDP, for example.

3.2.7 Material Availability Problems were Frequent

On multiple occasions, the CDS identified a virtual enterprise qualified to manufacture a part, but was hindered by the inability to locate a source for specified materials. For example, the Shock Tube Assembly requires an exotic extruded aluminum tubing. All four CDSs were provided this part and each identified a capable virtual enterprise. However, initially, none could locate a source for the aluminum. After an exhaustive search, a CDS, OACAC, located a source and had a special mill run made. It is apparent that for parts of this type, acquisition lead-times will be extended unless forecasts are available. It is interesting to note that the last four winning bidders for this part ended up defaulting on the production contract.

3.3 SUMMARY AND RECOMMENDATIONS

It is apparent that part problems exist today. The demand for manufactured parts is expected to increase as weapon systems age. Continued reductions in the industrial base will exacerbate the problem. The cost of acquiring parts will likely skyrocket, increasing the risk of grounded aircraft or fleets because of parts shortages.

The CATT Program is developing a business and technology infrastructure which, in combination with related initiatives, can expand the supplier base and ensure the availability of parts. Now, at the conclusion of Phase II, elements of the infrastructure have been analyzed, implemented, tested, and proven in the State of Oklahoma.

Continued effort to develop and refine the infrastructure elements is warranted. The combination of CDS activities and focused academic research projects has been conducive to identifying specific part production problems and provides an environment for testing and refining solutions. These specific activities should be continued and expanded to include additional weapon systems and stock classes. Further, accelerated development of applicable emerging technologies can overcome some of the problems associated with part technical data. Engineering data and reverse engineering technologies present particular promise and should receive increased

emphasis and focus in subsequent program phases. Finally, the infrastructure should be implemented in other regions so that a robust strategy for nationwide implementation can begin to take shape.

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